Space Weather Forecast

Issued on Monday, 13 February 2023 at 00:36 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Slight chance of Strong flares (R3 Radio Blackout) with Moderate flares (R1/R2 Radio Blackouts) likely. Chance of G1/Minor Storm and slight chance of G2/Moderate Storm on Days 1 and 2 (13-14 Feb).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity was Moderate, with the largest flare peaking at 12/0848 UTC from a region in the southeast of the disc. This is a relatively small and compact region which has had magnetic complexity, but has started to show some signs of fading recently. There are currently twelve sunspot groups on the disc, with three further Moderate-class flares and multiple Common-class observed in the last 24 hours. These were mostly either from the region mentioned above, but also from near the northwest limb.
No significant Coronal Mass Ejections (CMEs) have been detected in available imagery during the last 24 hours.

Solar Wind / Geomagnetic Activity: Solar winds continued to be slightly elevated through the period. Wind speeds declined somewhat from around 480 km/s to near 400 km/s. The total Interplanetary Magnetic Field was weak, with the north-south component also varying weakly. Geomagnetic activity was Quiet (Kp 1-2).

Energetic Particles / Solar Radiation: The count rate of energetic particles was at background levels with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is likely to be Moderate, with a slight chance of becoming High with any Strong flares. The main regions likely to flare are the more complex region in the southeast and the large region in the northwest.

Solar Wind / Geomagnetic Activity: Two eruptions occurring on 10th and 11th both gave CMEs which may give glancing impacts at Earth on Days 1 and 2 (13-14 Feb), although this is low confidence. There are no significant coronal holes in the forecast at present, so the forecast for the coming few days is mainly about the possibility of any CME arrivals. In the absence of CME arrivals, wind speeds are most likely to decline to slow levels.
Geomagnetic activity is therefore expected to be mainly Quiet to Unsettled. Perhaps rising to Active to G1/Minor Storm with a slight chance of G2/Moderate Storm on Days 1 and 2 should the above mentioned CMEs arrive, with the risk reducing into Day 3 (15 Feb).

Energetic Particles / Solar Radiation: The count rate of energetic particles is expected to remain at background levels, but there is a slight chance of this reaching the S1/Minor radiation storm level in response to any significant flares that occur.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	30	40	10	1
Strong	G3	No	5	5	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	70	70	60	50
Very Active	R3 to R5 X	No	20	20	15	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	15	15	15	10
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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